

Australian/New Zealand Standard®

Plastic roof and wall cladding materials— Methods of test

Method 4: Determination of diffuse light transmission

1 SCOPE This Standard sets out a method for determining the diffuse light transmission of plastic building sheets.

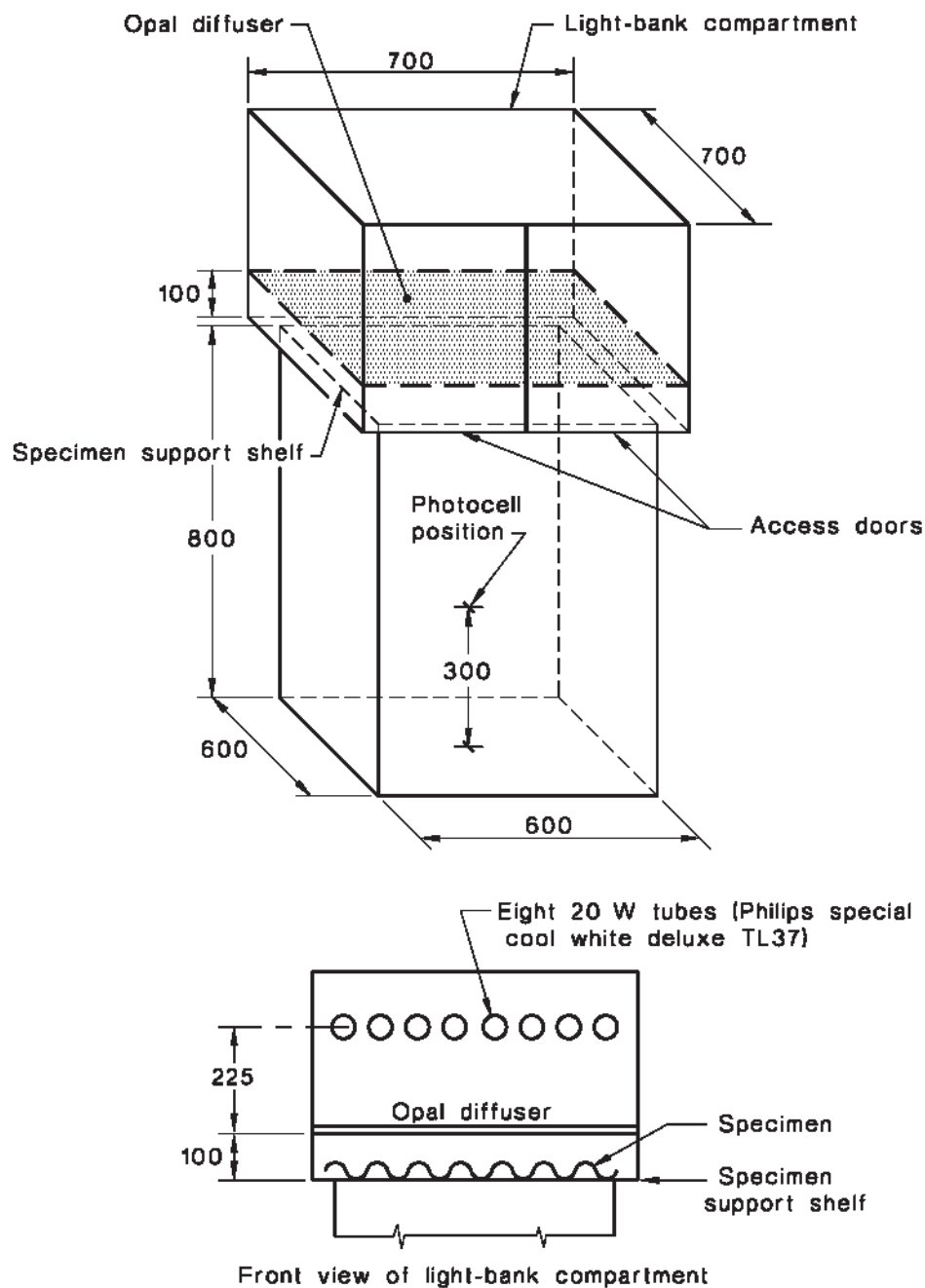
2 PRINCIPLE The test apparatus is calibrated, using neutral density filters, to provide a light transmission rating curve. The light transmitted through the test apparatus, with and without the test specimen in position, is measured and the percentage of transmitted light is reported after calculation and reference to the calibration curve.

3 APPARATUS The apparatus (see Figure 1) consists of a light transmission box, 600 mm × 600 mm × 800 mm high, painted matt white on the inside with an open top. A four-sided sample shelf, fixed flush with the top, supports a sample compartment 100 mm high. A four-sided shelf to support an optically neutral light diffuser (see Note 1) is fitted flush with the top of the sample compartment and supports a light-bank compartment. Eight 610 mm 20 W fluorescent artificial daylight tubes are mounted 225 mm above the diffuser shelf (see Note 2). The sample and light-bank compartment are accessible by light-tight doors, and the inside edges of the shelves are in line with the 600 mm × 600 mm internal dimensions of the light-reflecting box. A selenium-type potted photocell, or equivalent, is connected to a suitable microvoltmeter and mounted in position in the box (see Figure 1) with its sensor facing upwards. The photocell shall be removable for calibration against a series of neutral density filters. The size of the filters is such that they completely cover the mounting that contains the photocell (see Note 3).

4 TEST SPECIMENS The test specimens shall consist of pieces of finished sheet, 650 mm square.

5 PROCEDURE The procedure shall be as follows:

- (a) Before making any measurements, switch on the lamps and allow them to stabilize for 15 min. During the measurements, the voltage supplied to the lamps should be kept constant, using a constant voltage transformer where necessary.
- (b) At the end of the stabilization period, record the reading on the meter without the test specimen in position. (This may be adjusted to a value of 100 units by use of the potentiometer, if convenient.)
- (c) Place each of the neutral density filters over the photocell and take meter readings in turn. Where necessary, fix the filters over the photocell with a metal ring so that light does not intrude between the photocell mounting and the filter, and so that the metal ring does not attenuate light from reaching the photocell. Record the reading on the meter with each filter over the photocell in turn.



NOTES:

- 1 Opal 'Perspex' grade 040 is believed to be suitable.
- 2 Philips special cool white deluxe TL 37 is believed to be suitable.
- 3 The output of the selenium cell is dependent upon the measuring circuit. A high impedance voltmeter in parallel with a low impedance potentiometer across the cell is suitable. 'Wratten' filters of optical densities 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9 and 1.0 have been found suitable for use in calibration.

DIMENSIONS IN MILLIMETRES

FIGURE 1 LIGHT TRANSMISSION BOX

- (d) Remove the filters and record again the reading on the meter without a test specimen.
- (e) Place the test specimen on the sample shelf and record the reading on the meter.
- (f) Remove the test specimen and record again the reading on the meter without a test specimen.
- (g) Replace the test specimen on the sample shelf so that it is turned 90° to its previous position, and record again the reading on the meter.

6 CALCULATION OF LIGHT TRANSMISSION The light transmission is calculated as follows:

NOTE: Appendix A gives an example of calculating the light transmission.

- (a) Calculate the average of the three meter readings taken without the test specimen in position (see Clause 5(b), (d) and (f)) and record as I_0 .
- (b) Calculate the average of the two meter readings taken with the test specimen in position (see Clause 5(e) and (g)) and record as I_1 .
- (c) Calculate the readings on the meter with the filters over the photocell as percentages of I_0 , and record as measured percentage light transmission.
- (d) Construct a calibration curve by plotting the measured percentage light transmission of each filter as nominated by the supplier.
- (e) Calculate the measured percentage light transmission of the specimen under test using the expression $I_1/I_0 \times 100$, and correct according to the calibration curve to provide the corrected light transmission value of the specimen. Record this to the nearest 1%.

7 REPORT The following information shall be reported:

- (a) Description of material.
- (b) The corrected percentage light transmission as the light transmission of the sheet.
- (c) Reference to this Australian/New Zealand Standard, i.e. AS/NZS 4257.4.